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RESOURCE PARTITIONING AND THE EVOLUTION OF SPECIALIST ORGANIZATIONS: THE ROLE OF LOCATION AND IDENTITY IN THE U.S. WINE INDUSTRY

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Analyses of founding and mortality rates of specialist organizations in the U.S. wine industry over the period 1941–90 support Carroll's (1985) location-based resource-partitioning model—crowding of generalists in the market center creates opportunities for specialists. Further, specialists are adversely affected when they violate their organizational form's identity characteristics and also when generalists can assume a robust identity allowing them to operate in both specialist and generalist industry segments. The results suggest a prominent role for an organizational form's identity in resource partitioning.

The proliferation of specialist organizations in mature industries is consistent with an ecological model of resource partitioning (Carroll, 1985). Mature industries typically feature a high degree of market concentration. With increasing concentration, generalists tend to compete vigorously for the center of the market, thus allowing specialists to thrive on the periphery. The generalist-specialist distinction revolves around the concept of an *organizational form* that embodies not only structural features, but also the environmental factors that define the form's niche (Hannan & Freeman, 1989). Ecological theories of niche width contain a simple distinction between generalist and specialist organizational forms. When an organizational subpopulation's niche encompasses a wide range of resources, the subpopulation is composed of generalists. Conversely, when an organizational subpopulation's niche includes a narrow range of resources, it is composed of specialists. According to the resource-partitioning model, when markets concentrate, the death rate of generalist organizations will increase, and that of specialist organizations will decrease. At the same time, the model predicts that the founding rate of generalists will decrease and that of specialists will increase with market concentration. This view of resource partitioning implies that differing locations in a resource space of generalists and specialists account for variations in founding and mortality rates.

In this article, I extend the location-based resource-partitioning model by exploring the role of the identity of specialist and generalist organiza-

tional forms in resource partitioning within the post-Prohibition American wine industry. The identity of farm wineries is tied to their claims of authenticity. Farm wineries are perceived as being small organizations with the high-quality products typically associated with vineyard ownership. Farm wineries that violate these identity characteristics of their organizational form should experience poor performance. In the traditional resource-partitioning model, it is assumed that the generalist and specialist organizations are segregated into separate resource spaces. Generalist organizations, however, can benefit from the growth of the specialist segment by assuming robust identities, which may allow them to operate in both resource spaces. The success of generalist organizations in establishing robust identities will depress the founding rate and elevate the mortality rate of specialist organizations. I examined the impact of two strategies, increased brand proliferation and advertising intensity, used by mass-production wineries to achieve robust identities in the wine industry. Hypotheses about identity-based resource partitioning were tested using life history data on specialist organizations in the post-Prohibition American wine industry.

SPECIALIST ORGANIZATIONS IN THE U.S. WINE INDUSTRY, 1940–90

The post-Prohibition American wine industry featured increasing consolidation. At the beginning of the observation period in 1940, 989 wineries were in operation.¹ This number declined almost continuously over the study period to a minimum

I would like to thank William Barnett, Will Mitchell, Joel Podolny, and Jim Walsh for their insightful comments on an earlier version of this article.

¹ By wineries, I refer to wine-making firms. Even in 1940 there were 45 U.S. wine-making firms with more

of 330 in 1967. Observers of the wine industry attribute industry consolidation to two factors—the operation of economies of scale and acquisitions of small and medium-sized wineries, often by firms from outside the industry.

Despite the reduction in numbers, industry sales continued to rise. Total domestic shipments by American wineries rose from 86.1 million gallons in 1940 to 440.9 million gallons in 1990. Large firms, such as United Vintners, E&J Gallo, and Guild Wineries, achieved most of these sales gains, at the expense of the smaller producers. This trend is reflected in increasing levels of industry concentration over this period. An indicator of industry concentration that is highly correlated with the four-firm sales concentration ratio is the share of industry capacity held by the largest four firms. According to an industry publication, *Wines & Vines*, this ratio increased from 23 percent in 1940 to 52.4 percent in 1990.

Since 1967, the number of wineries has increased rapidly, growing to 1,327 by 1990. This spurt in numbers is largely the result of the founding of wineries with a specialist organizational form—farm wineries. The number of farm wineries in the United States that were in operation for all or part of 1990 stood at 1,140. Farm wineries typically manufacture premium, varietal wines, often from a designated vineyard, operating on a relatively small scale. These wineries have variously been called “boutique,” “château,” and “small” wineries. I followed Adams (1985: 537) in calling this specialist organizational form a “farm winery.”

Current federal regulations authorize the use of a varietal name for a wine that derives 75 percent of its volume and its predominant taste, aroma, and other characteristics from the given botanical variety of grape from which the name is derived. In addition, varietal wines are required to be labeled with an appellation of origin, and at least 75 percent of the volume of the specified grape variety must be obtained from that appellation (Seff & Cooney, 1984: 437).

Mass production wineries—the generalist organizational form in the wine industry—tend to produce generic wines such as burgundy, chablis, claret, madeira, port, rhine, sherry, and tokay. Most generic wines take their names from areas of Europe. These generic wines, also known as jug

wines, are usually lower-priced than varietal wines. In 1989, jug wines produced by California wineries accounted for as much as 57 percent of the volume of wine sales in the United States (Evenson, 1990). Unlike mass production wineries, farm wineries are typically founded with a distinct niche in mind. Often they make small quantities of wine from only one or two grape varieties. For example, Laurel Glen Vineyard in Glen Ellen, California, produces only 5,000 cases of Cabernet Sauvignon (Stuller & Martin, 1989).

Farm wineries lack the resources necessary for mass-market advertising. Farm wineries reach consumers through tasting rooms on winery premises and word-of-mouth publicity generated by consumers. Many use their winery as a marketing tool by organizing receptions, weddings, and special theme tastings (Fox, 1987). The fate of farm wineries is determined to a great extent by the opinion of wine critics. Wine critics are influential enough that winemakers often create wines that agree with the critics' palates (Unwin, 1991: 355).

Most farm wineries start small, in converted basements, barns, and other buildings. Leasing production equipment until sales stabilize at sufficiently high levels minimizes initial capital outlays. Instead of acquiring sophisticated technology, farm wineries focus on discovering a winning combination of climate, soil, and grape variety. Farm wineries often cooperate with one another to reduce production and distribution costs and have jointly petitioned the Bureau of Alcohol, Tobacco, and Firearms to recognize certain geographical areas as American Viticultural Areas (AVAs). This designation allows wineries within an AVA to distinguish their products by labeling their wines with the AVA as an appellation of origin.

Below, I develop several hypotheses that attempt to explain the evolutionary patterns exhibited by farm wineries, the specialist organizational form in the U.S. wine industry. Though the hypotheses are framed specifically with reference to the wine industry, they are broadly applicable to the evolution of specialist organizations in mature industries.

THEORY AND HYPOTHESES

Resource Partitioning: The Role of Location in Resource Space

Carroll (1985) developed a location-based model of resource partitioning to account for the mortality rates of specialist firms in environments characterized by varying degrees of market concentration. As the level of concentration in a market rises, the death rate of generalist firms increases as they com-

than one bonded premise or plant. The analysis in this study was performed at the level of the firm, not the bonded premise. Analyzing outcomes at the firm level has distinct advantages since it is the level at which decisions involving competitive strategy are made.

pete with each other to gain control over the center of the market. Generalist organizations move toward the center of the resource space, and their failure rate increases as a result of crowding. The surviving generalist firms that come to dominate the market are fewer and larger. Economies of scale in production and marketing imply that the best location for a generalist firm is in the center of a concentrated market. The degree of overlap in generalist firm strategies is high, since most of them try to exploit resources available at the market center. The total resource space covered by generalist firms is smaller than it would be in a competitive, unconcentrated market where firms offer differentiated products or services. Therefore, in a concentrated market specialist firms have access to greater resources located on the periphery of the resource space. They can exploit peripheral market segments without directly competing with the larger generalists.

Greater resource availability should improve the survival chances of such specialist firms as a market concentrates. It should also increase foundings of specialist organizations (Freeman & Lomi, 1994; Lomi, 1995). In an earlier study of farm winery foundings in the U.S. wine industry (Swaminathan, 1995), I found support for the location-based resource-partitioning model but did not take into account additional explanations, such as the role of an organizational form's identity characteristics, in the resource-partitioning process. I address this issue below.

Resource Partitioning: The Role of Specialist and Generalist Identities

The collective identity of organizations plays a key role in the evolution of specialist organizations within industries. Specialist organizations often try to establish a collective identity that is distinct from that of generalist organizations. Clemens argued that organizational form "appears as a movement frame which both informs collective identity and orients groups toward other actors and institutions" (1996: 205). Pólos, Hannan, Carroll, and Péli (1998) used the method of logical formalism to define an organizational form as a socially constructed collective identity of classes of organizations. Common sets of beliefs can lead entrepreneurs in emerging niches within industries to undertake collective action that can help legitimate a specialist organizational form.

The emergence of specialist organizations in industries such as brewing and wine making resembles that of a social movement. The generation of a collective identity is crucial to a movement's suc-

cess (Melucci, 1989). New social movements, such as environmentalism and the women's movement, have coalesced around collective identities rather than around specific grievances or perceptions of injustice. According to Melucci, a collective identity is generated via an interactive process in which members construct a collective "we" through interactions with nonmembers, countermovements, and portrayals by the media. As a movement emerges, boundaries are created that reinforce the "us-versus-them" distinction (Taylor & Whittier, 1992). A similar process occurs when new organizational forms emerge. Romanelli (1989) suggested, for instance, that as entrepreneurs in an emerging industry interact by going to the same conferences and trade shows and by seeking similar resources, opportunities arise for sharing information and resources. These interactions also isolate the new organizational form from competitors and other external threats (Garud & Van de Ven, 1989).

The success with which emerging specialist organizations can respond to the threat of retaliation from incumbent generalist organizations is closely tied to the strength of their collective identity. This identity can be so powerful that the generalists cannot imitate the routines of the specialist organizational form even when they have the resources and technology to do so. For instance, mass production firms in the brewing industry, such as Anheuser-Busch, have the technical capabilities to produce "microbrewed" beer. Their attempts to do so, however, have met with very limited success because such actions conflict with the collective identity of microbrewers as defined by consumers. More specifically, consumers buying specialty beers seek a malt beverage brewed in a small, craft-like firm according to traditional methods and using natural ingredients (Carroll & Swaminathan, 2000).

The success of microbreweries in preventing imitation by the mass producers is largely due to their success in strategically deploying their identity. Bernstein (1997) identified two identity deployment strategies. The "identity for critique" strategy involves confronting the identity and values of the dominant culture. Microbreweries and "brewpubs" emphasize differences between their beers and those produced by mass production breweries.

In using the second identity deployment strategy, "identity for education" (Bernstein, 1997), a movement either challenges the dominant culture's perception of itself or attempts to use its identity to gain legitimacy by emphasizing noncontroversial activities. For instance, although their efforts were ultimately unsuccessful, in the 1860s brewers attempted to align themselves with those advocating

prohibition by professing that excessive use of hard liquor was a terrible social problem. At the same time, they differentiated beer from spirits and asserted that beer drinkers were upstanding members of society (Baron, 1962).

An emerging specialist organizational form that achieves some success may also provoke responses from incumbent generalist organizations. For example, such incumbents respond to competence-destroying technological discontinuities by improving the price-performance characteristics of their current technology. Thus, telephone companies introduced digital subscriber lines in response to the challenge posed by cable modems. Such a process is consistent with the idea that intense competition causes central players in an industry to adopt value-adding routines from the periphery (Leblebici et al., 1991). Thus, incumbents may try to incorporate a new technology or approach that gives the new population a competitive advantage. Their success partially depends on whether the new technology is competence-enhancing or competence-destroying. Incumbents will have great difficulty incorporating competence-destroying technologies because these do not build on their existing routines and skills (Tushman & Anderson, 1986). An incumbent generalist organization that is able to assume a robust identity (Padgett & Ansell, 1993; Stark, 1996) by adding the identity characteristics of the specialist organizational form to its original identity will reduce the survival chances of specialist organizations. The identity characteristics of specialist and generalist organizations affect the evolution of specialist organizations in the wine industry in two ways. First, specialists that can maintain claims to authenticity improve their life chances. Second, the greater the extent to which generalists can assume a robust identity, the lower the founding rate, and the higher the mortality rate, of specialists.

Specialist identity: Maintaining authenticity.

Two important identity characteristics of a farm winery are its size and its reputation for quality. As a small winery on a vineyard, a farm winery draws attention to the fact that wine is an agricultural product like other foods. Most definitions of boutique or chateau or farm wineries involve an indicator of size. Industry norms suggest that a farm winery is one that produces fewer than 50,000 cases of wine per year or has a storage capacity of less than 100,000 gallons (Hiaring, 1976). These size-based definitions are also reflected in laws passed by several states to encourage the establishment of farm wineries.

The wine industry is characterized by strong economies of scale (Moulton, 1984). Economies of

scale are likely to operate if products are highly standardized, as is the case with the goods of incumbent mass producers in this industry. Wine making is a capital-intensive process. Wineries need to invest in stainless steel tanks and oak barrels for fermentation, storage, and blending, in computers for process control, and in forklifts, trucks, bottling lines, and other equipment. Economies of scale exist both in winery construction and operation. One estimate suggests that if the unit production cost for each of 5,000 cases is 100, then the unit cost for 100,000 cases would be 73; for 500,000 cases, 54; and for 3,000,000, 41 (Moulton, 1984).

Growth to a moderate size may be beneficial for farm wineries—a larger operation may reap certain economies of scale and thus lower its costs. But growth beyond an optimal middle range may bring farm wineries into direct competition with younger, smaller mass producers that produce varietal wines (see Amburgey, Dacin, and Kelly [1994] for an account of similar effects of growth on credit union mortality). Expansion beyond a certain size may also involve diseconomies of scale; for example, equipment may have to be standardized and an owner's labor may have to be replaced by hired labor or capital equipment (Moulton, 1984: 396). Most importantly, excessive growth may make it impossible for a farm winery to capitalize on its identity as being a local organization with a distinctive character and a source of local pride.

Farm wineries that own vineyards can appeal to an even smaller niche by labeling their products as estate-bottled. Estate-bottled wines are made entirely from grapes that come from a vineyard owned or controlled by a winery; in addition, the vineyard and winery must both fall within the same AVA. By the end of 1990, about 120 AVAs had been recognized in the United States. Owing to the restrictive labeling requirements, mass production wineries rarely, if ever, produce estate-bottled wines. Farm wineries that produce estate-bottled wines acquire a marketing advantage, as consumers often attribute superiority to such products (Prial, 1992). Thus, farm wineries are typically small organizations, and vineyard ownership often conveys an image of high quality. Farm wineries that violate these two identity characteristics of their organizational form do so at their own peril.

Hypothesis 1a. Midsized farm wineries will experience lower mortality rates than other farm wineries.

Hypothesis 1b. Farm wineries that own greater amounts of vineyard land will experience lower mortality rates than other farm wineries.

Generalist identity: Achieving robustness. The location-based resource-partitioning model allows taking a useful first cut at explaining the evolution of specialist organizational forms. Two characteristics of the model should be noted. First, segregating processes that prevent specialist organizations from making the transition to generalist, and vice versa, are assumed to exist. Second, the model is silent about the response of generalists to the growth of the specialist segment. One possible response of generalists would be to develop a robust identity allowing them to operate in both the generalist and specialist segments.

The location-based resource-partitioning model (Carroll, 1985) is an attempt to characterize patterns of interdependence among organizations within a population, an issue addressed earlier by Hawley (1950), who developed a model with strikingly different predictions. According to Hawley, competition operates through selection processes, which eliminate the weakest competitors. The resolution of competition is followed by functional differentiation, as those who exit a market move into adjacent niches. As Carroll (1985) noted, Hawley's model is similar to the resource-partitioning model in that they both lead to predictions of a shift from competitive to symbiotic relations between organizational forms. However, according to Hawley's model, losers adapt through transformation, whereas according to Carroll's model, losers die and are replaced by new kinds of organizations. From Hawley's model, one would expect firms that exit the mass producer market to move into the peripheral markets populated by specialist organizational forms. In Carroll's resource-partitioning model, however, exits from the mass producer market coincide with the death of such firms.

In the wine industry, the evidence does not support Hawley's adaptationist argument. There is no record of a transition from generalist mass producer to specialist farm winery. Mass producers typically exit the industry by failing or, in some cases, being acquired by another mass producer. In addition, laws in several states restrict farm wineries to a certain production capacity, thus preventing mass producers from making a transition to the specialist form. Specialist organizations such as farm wineries are usually newly founded organizations, although there are a few cases of entry through acquisition by firms or individuals from outside the industry.

With the passage of time, however, blending may

blur the boundaries between the specialist and generalist organizational forms. Generalists are often the spawning grounds for entrepreneurs who go on to found specialists (Brittain & Freeman, 1980; Freeman, 1986). Founders leave the imprint of their previous labor market experience on the strategies of new organizations (Boeker, 1988). Boundaries between generalist and specialist forms may also erode through a process of "random drift" (Hannan & Freeman, 1989: 58), the cumulative impact of unintended changes in organizational routines. Random drift can also result from knowledge transmitted from one organization to another as individuals pursue career paths that intersect organizations with generalist and specialist forms.

Without the presence of strong segregating processes, generalists may be able to adapt to changing environmental conditions by copying routines from specialists through "mimetic isomorphism" (DiMaggio & Powell, 1983). Generalist wineries have at least two strategies available for creating a robust identity that will allow them to operate in both the generalist and specialist segments. First, they can respond to the growth of specialist segments by offering a wider variety of products, including some that resemble the products offered by specialists (Chamberlin, 1933; Scherer, 1980: 384–402). Bain (1956) concluded that product differentiation is as important as economies of large-scale production and distribution in providing market incumbents with a cost advantage over new entrants. Several mass producer wineries, including industry leader E&J Gallo, now count high-quality varietal wines among their products. One indicator of product differentiation is the number of brands produced by mass producers. Pioneering brands tend to have long-term advantages when consumers have imperfect information about product quality (Bain, 1956; Schmalensee, 1978, 1982; Scherer, 1980: 258–260). The greater the average number of brands available in the market, the more difficult it is for a new brand to establish itself. Therefore, brand proliferation among mass producers will likely help them achieve a robust identity and depress the growth of the specialist farm winery population.

Hypothesis 2a. The greater the average number of brands per mass producer winery, the lower the founding rate of farm wineries.

Hypothesis 2b. The greater the average number of brands per mass producer winery, the higher the mortality rate of farm wineries.

Second, a generalist winery can achieve a robust identity by increasing advertising spending to cre-

ate an image of quality. Sales response to advertising expenditure is typically assumed to take the shape of a logistic curve (Ackoff & Emshoff, 1975; Brown, 1978; Comanor & Wilson, 1974). Larger firms' advertising may generate a curve representing a more favorable response because of consumer inertia. Economies of scale in promotion and advertising may allow major firms to charge higher prices for premium products. Firms that operate nationally benefit more since none of their advertising is wasted in terms of media utilization. Also, they are less affected by migration of consumers from one part of the country to another.

Hypothesis 3a. The greater the average advertising intensity of mass producer wineries, the lower the founding rate of farm wineries.

Hypothesis 3b. The greater the average advertising intensity of mass producer wineries, the higher the mortality rate of farm wineries.

Attempts at brand proliferation, or increasing advertising spending, however, are determined to a large extent by the strategic decisions of mass producers and can be viewed as endogenous sunk costs. Mass producers can introduce brands to fill all niches and escalate advertising expenditures in ways that deter entry into and encourage exit from the specialist or fringe segment of an industry (see, for example, the analysis of the ready-to-eat breakfast cereal industry by Sutton [1991: 227–247]).

I examined the effects of location and identity-based resource partitioning on the founding and mortality rates of farm wineries in the context of baseline models. These baseline models incorporated the effects of local and extralocal density dependence, niche formation as captured by the level of wine imports, and heterogeneity in state-level niche structure as determined by per capita personal income, per capita wine consumption, population living in dry areas, and the existence of farm winery laws. The baseline mortality model also included organizational characteristics such as size, vineyard ownership, product type, and mode of entry. Hypotheses relating the evolution of farm wineries to the process of resource partitioning were tested with event count and event history data from the American wine industry over the period 1941–90.

RESEARCH DESIGN

Models and Methods

In the analysis reported below, I tried to identify factors that influenced the evolution of the farm winery organizational form in the wine industry in

post-Prohibition America. In modeling the founding and mortality rates of farm wineries, I used event count models for founding rates and event history analysis for mortality rates. Though farm wineries were theoretically "at risk" of emerging since the repeal of Prohibition in 1933, data availability restricted the period of analysis to 1941–90.

In modeling the organizational founding process, I treated the population as the unit of analysis and analyzed an annual time series of the numbers of state-level farm winery foundings. Barron (1992) described generalized quasi-likelihood estimation procedures to model event counts that are autocorrelated. This method, however, can only be applied to a single time series of event counts. Because my data contain multiple time series of farm winery foundings clustered by state, using this method would have produced errors in the correction for autocorrelation. In this study, I followed Guo (1996), who used a random effects model to estimate counts of a medical procedure performed in 175 hospitals in each quarter between 1988 and 1991. In Guo's (1996) study, the quarterly observations contributed by a hospital were unlikely to be independent. But, conditional on a hospital-specific random effect, the quarterly counts from the same hospital could be treated as independent. In my study, I had counts of farm winery foundings in 51 clusters (50 states and the District of Columbia). A random-effects model for such clustered count data is given by

$$\mu_{ij}(\theta_i) = T_{ij} \exp(x'_{ij}\beta)\theta_i, \quad (1)$$

where θ_i is a state-specific random effect, $\mu_{ij}(\theta_i)$ is the mean count for observation j in state i , and T_{ij} is exposure for observation j in state i . In my analysis, T_{ij} is set to 1, that is, I assume that all states have equal exposure. The assumption underlying this model is that the count random variables in the i th state are mutually independent, given a state-specific random effect θ_i . A negative multinomial regression model can be obtained by assuming that the random effect θ_i in Equation 1 has a gamma distribution with density $f(\theta_i) = \theta_i^{\phi-1} \exp(-\phi\theta_i)\phi^\phi / \Gamma(\phi)$, so that the mean equals 1 and the variance is $\sigma^2 = \phi^{-1}$.

For the mortality analyses, I used the individual organization as the unit of analysis and estimated a firm-specific instantaneous mortality rate that is age-dependent. The choice of a specific parametric model of age dependence in farm winery mortality rates was based on the results of exploratory non-parametric analysis (SAS Institute, 1989; Wu, 1990). This analysis revealed that the extended log-logistic model provided the best fit for the farm

winery data (Brüderl & Diekmann, 1995). Following Blossfeld and Rohwer (1995: 184–185), I specified this model as follows: $r(t) = cb(at)^{b-1}/(1 + at)^b$, where a is $\exp\{A\alpha\}$, b is $\exp\{B\beta\}$, and c is $\{C\gamma\}$. In this model, it is assumed that the first term of the covariate vectors A , B , and C is a constant equal to 1. The coefficients α , β , and γ are the model parameters to be estimated. I assumed that the effect of the covariates was independent of age t and included them in C . Therefore, the model I estimated is given by $r_i[t|\mathbf{x}_{in}(t)] = cb(at)^{b-1}/(1 + at)^b$, where a is $\exp\{\alpha_0\}$, b is $\exp\{\beta_0\}$, and c is $[\gamma_0 + \gamma_n \mathbf{x}_{in}(t)]$, α_0 and β_0 are the parameter estimates for the constants in the A and B vectors, γ_0 is the parameter estimate for the constant in the C vector, γ_n is a vector of parameter estimates for the covariate vector $\mathbf{x}_{in}(t)$, and t is the age of the organization. Again, $r_i[t|\mathbf{x}_{in}(t)]$ is the organization-specific mortality rate given by a vector of covariates, $\mathbf{x}_{in}(t)$, for organization i . In the above model, if β_0 is greater than 0, it implies that the organizational mortality rate increases to a peak and then declines with age t . This specification of age dependence is consistent with some previous research that has shown nonmonotonic age dependence in organizational mortality rates (Brüderl & Schüssler, 1990). The vector of covariates, $\mathbf{x}_{in}(t)$, exerts a log-linear effect on the organizational mortality rate. As is conventional, I used the chi-square likelihood ratio statistic to test the overall fit of a specific model with a given number of constraints to that of a nested model of the same functional form with fewer constraints.

The relative fit of models can be determined by computing the likelihood ratio test statistic, which is defined as $\mu = \max L_0 / \max L_1$, where L_0 and L_1 denote the respective likelihoods of the null model (subject to, say, n constraints) and the alternative model that relaxes the constraints respectively. With large samples, $-2\ln \mu$ is distributed as a chi-square with n degrees of freedom. I report the negative of the log likelihood for the founding and mortality models in my tables. Therefore, two times the difference of the negative log likelihoods of a pair of hierarchically nested models in the tables has approximately a chi-square distribution under the null hypothesis.

I used a maximum likelihood estimation program written by Guo (1996) along with the numerical optimization package GQOPT (Quandt, 1997) to estimate negative multinomial models of state-level farm winery foundings. To estimate the extended log-logistic mortality rate models, I used Version 5.7 of the statistical package TDA (Rohwer, 1994).²

Data

Annual directories of wineries compiled by *Wines & Vines* constitute the primary source of event history data on the population of winemaking firms. My data include information on all American wine producers. The entries in the *Wines & Vines* directories identify each bonded premise, company names and addresses, bonded winery or wine cellar license numbers, current owners or managers, sizes in terms of storage capacity, vineyards owned, and products and brand names. Because the listings in the annual directories relate to plants (individual bonded premises) rather than to firms, I aggregated the histories for all plants belonging to the same firm. That is, my data record firm-level event histories on foundings and deaths. The founding year was assumed to be the year in which a wine-making firm first appeared in the directory. Since the directories were available from 1940 onward, I could accurately identify founding years for wineries founded in the period covered by this study. Wineries were assumed to have died in the first year in which they failed to appear in the directory or in the first year in which they were listed as under new ownership. I assumed changes in ownership if addresses and bonded winery license numbers of wineries remained the same while owner names changed. I examined industry news columns in monthly issues of *Wines & Vines* over the entire period of observation to corroborate the data on winery foundings, dissolutions, and acquisitions. I further cross-validated the event history data by examining annual records provided by the Bureau of Alcohol, Tobacco, and Firearms.

Industry data were obtained from the *Wines & Vines Annual Statistical Survey* and *Jobson's Wine Marketing Handbook*. Firm-level data were obtained from the *Wines & Vines Yearbook of the Wine Industry*, *Wines & Vines Wineries of North America and Vineyard Industry Suppliers*, *Wines & Vines Directory of the Wine Industry*, and *The New Connoisseur's Handbook of California Wine* (Roby & Olken, 1991). For the mortality analyses, each organization's life history was broken up into annual spells, with all but the last spell being censored on the right. Wineries that survived into 1991 were also treated as right-censored. To correct for time aggregation bias, I adopted the procedure sug-

² Data on farm wineries that were alive at the end of 1990 were "right-censored" (Blossfeld & Rohwer, 1995:

34–35). TDA 5.7 accommodates such data. The data on farm wineries are not "left-censored," since I considered only those wineries founded in the period 1941–90.

TABLE 1
Descriptive Statistics for Variables Used in the Analysis of Farm Winery Founding Rates^a

Variable	Mean	s.d.	Minimum	Maximum
Number of farm winery foundings by state	0.678	3.156	0.000	58.000
State per capita annual personal income ^b	9.777	3.630	1.767	22.459
State per capita annual wine consumption ^c	1.146	0.988	0.000	7.033
Percentage of state population in dry areas	6.176	12.597	0.000	63.112
State farm winery law ^d	0.103	0.305	0.000	1.000
Density of farm wineries in state	8.430	32.710	0.000	484.000
Density of mass production wineries in state	4.711	22.271	0.000	206.000
Volume of wine imports ^e	40.991	42.957	1.003	142.411
Industry concentration ^f	0.0008	3.694	-8.537	6.403
Scale of mass production wineries ^g	3.166	1.865	0.779	6.626
Brand proliferation among mass production wineries ^h	2.503	0.323	1.872	3.176
Advertising intensity among mass production wineries ⁱ	0.335	0.105	0.123	0.560

^a $n = 2,524$ for all variables.

^b Thousands of constant 1987 dollars.

^c Gallons.

^d 1 = "yes," 0 = "no."

^e Millions of gallons.

^f Residual of regression of scale, brand proliferation, and advertising intensity variables on the four-firm ratio.

^g Average capacity in millions of gallons.

^h Average number of brands.

ⁱ Advertising costs per gallon in constant 1987 dollars/gallon sold.

gested by Petersen (1991): for organizations that did not survive, I assumed that the mortality event occurred at the midpoint of the last annual spell. To deal with time-varying covariates, I updated their values at the beginning of each year for each organization (Hannan & Freeman, 1989: 187; Tuma & Hannan, 1984).

Tables 1 and 2 provide descriptive statistics on the variables used in the founding and mortality rate analyses, respectively. As noted above, I assumed farm wineries to be at risk of being founded after the repeal of Prohibition in 1933. However, since information for several variables was only available from 1940 onward and all independent variables were lagged by one year to ensure exogeneity with respect to the dependent variable in question, I could analyze farm winery founding and failure rates only for the years 1941–90. A total of 1,711 farm wineries were founded during the period. The data for the analysis of founding rates were organized as an annual time series for the years from 1941 through 1990 for all variables. The data for the analysis of organizational mortality rates were organized in firm-year spells. To be consistent, I only considered farm wineries founded in or after 1941 in the mortality analysis. Using such a procedure, the total number of firm-year spells generated by the 1,711 farm wineries is 14,205. However, missing firm-level data on some of the independent variables resulted in 11,987 usable

firm-year spells on 1,389 firms for the mortality analysis.³

RESULTS

Table 3 presents negative multinomial models of the state-level founding rates of farm wineries. Model 1 represents a baseline model that takes into account the effects of niche characteristics on founding rates. States with higher per capita incomes and wine consumption levels experienced a higher rate of farm winery foundings. The results also suggest substantial variation across states in the social acceptability of farm wineries: the farm winery founding rate is lower in states that have greater proportions of their populations living in dry areas. Institutional support in the form of farm winery laws increases the founding rate of farm wineries. Model 2 takes into account density dependence in founding rates. State-level farm winery density has a significant, nonmonotonic effect on the founding rate of farm wineries, thereby sup-

³ Delacroix, Swaminathan, and Solt (1989) employed a time trend variable to capture the effects of unobserved variations in a selection environment over time. The inclusion of such a variable in both the founding and mortality models reported below did not alter the results appreciably. Moreover, the time trend variable itself did not significantly affect either vital rate.

TABLE 2
Descriptive Statistics for Variables Used in the Analysis of Farm Winery Mortality Rates^a

Variable	Mean	s.d.	Minimum	Maximum
State per capita annual personal income ^b	14.964	3.083	3.600	22.459
State per capita annual wine consumption ^c	2.919	1.359	0.056	4.810
Percentage of state population in dry areas	2.239	6.459	0.000	52.276
State farm winery law ^d	0.234	0.423	0.000	1.000
Organizational size ^e	9.548	1.212	5.165	12.429
Acres of vineyard owned	29.630	51.68	0.000	750.000
Number of brands	1.339	1.026	0.000	12.000
Table wine producer ^d	0.951	0.215	0.000	1.000
Dessert wine producer ^d	0.140	0.347	0.000	1.000
Fruit wine producer ^d	0.158	0.365	0.000	1.000
Sparkling wine producer ^d	0.134	0.341	0.000	1.000
Vermouth producer ^d	0.022	0.147	0.000	1.000
Brandy producer ^d	0.009	0.094	0.000	1.000
Entry through acquisition ^d	0.079	0.269	0.000	1.000
Density of farm wineries in state	177.830	187.542	1.000	493.000
Density of farm wineries in state at founding	119.231	135.426	1.000	493.000
Density of mass production wineries in state	69.704	69.443	0.000	206.000
Total capacity of farm wineries ^f	16.682	8.366	3.346	28.414
Volume of wine imports ^f	86.782	38.687	2.267	142.411
Industry concentration ^g	-1.154	3.625	-8.551	6.376
Scale of mass production wineries ^h	5.280	1.436	1.045	6.626
Brand proliferation among mass production wineries ⁱ	2.491	0.221	1.909	3.176
Advertising intensity among mass production wineries ^j	0.395	0.096	0.175	0.533

^a $n = 11,987$ for all variables.

^b Thousands of constant 1987 dollars.

^c Gallons.

^d 1 = "yes," 0 = "no."

^e Gallons of installed capacity; logarithm.

^f Millions of gallons.

^g Residual of regression of scale, brand proliferation, and advertising intensity variables on the four-firm ratio.

^h Average capacity in millions of gallons.

ⁱ Average number of brands.

^j Advertising costs per gallon in constant 1987 dollars/gallon sold.

porting Hannan's (1986) model of density-dependent evolution.⁴ In addition, state-level mass production winery density had a negative effect on the farm winery founding rate, implying local competitive interaction between the two organizational forms.

Model 3 presents the effects of location-based resource partitioning in addition to those of density and niche characteristics on the founding rate of farm wineries. Industry concentration, the indicator used to denote location-based resource partitioning, is positively correlated with the variables measuring scale, brand proliferation, and advertising intensity among mass production wineries. The basic idea in using industry concentration as a proxy for resource partitioning in previous studies

(Carroll, 1985; Lomi, 1995; Swaminathan, 1995) is that greater firm-level homogeneity is expected at higher levels of concentration. In keeping with this idea, I constructed the resource-partitioning variable by calculating the residuals from a regression of the variables measuring scale, brand proliferation, and advertising intensity among mass production wineries on the four-firm concentration ratio. In other words, the resource-partitioning variable named "industry concentration" in the tables picks up the variation in the four-firm concentration ratio that cannot be attributed to these three variables. Presumably, use of this variable captures the homogenization of firms that occurs as industries become more concentrated. In model 3, the location-based resource-partitioning variable has a positive and significant effect on the founding rate. Model 3 shows that the founding rate of farm wineries increases with the average scale of mass production wineries. Scale economies in production, distribution, and R&D may act as mobility barriers, depress-

⁴ In models not reported here, out-of-state farm winery density and population mass measured by the total capacity of farm wineries had nonsignificant effects on the state-level founding rate of farm wineries.

TABLE 3
Negative Multinomial Regression Models of Farm Winery Foundings^a

Variable	Model 1	Model 2	Model 3
Constant	-2.0506** (.2760)	-2.4864** (.2755)	-1.3154 [†] (.7395)
State per capita annual personal income ^b	0.0775** (.0184)	0.1254** (.0194)	-0.0770 [†] (.0393)
State per capita annual wine consumption ^c	0.6362** (.0625)	0.3084** (.0678)	0.3195** (.0764)
Percentage of state population in dry areas	-0.0570** (.0078)	-0.0477** (.0076)	-0.0524** (.0079)
State farm winery law ^d	0.5396** (.1031)	0.3525** (.1100)	0.3051** (.1125)
Density of farm wineries in state		0.0171** (.0014)	0.0141** (.0016)
Density of farm wineries in state squared/1,000		-0.0306** (.0023)	-0.0250** (.0027)
Density of mass production wineries in state		-0.0068** (.0022)	-0.0069** (.0020)
Volume of wine imports ^e			-0.0066** (.0015)
Industry concentration ^f			2.2146** (.7403)
Scale of mass production wineries ^g			0.4722** (.0736)
Brand proliferation among mass production wineries ^h			-1.4873** (.1423)
Advertising intensity among mass production wineries ⁱ			-4.0710** (.3527)
ϕ^j	0.4075** (.0769)	0.5129** (.1010)	0.4901** (.0971)
-Log likelihood	-574.75	-652.44	-713.07
Number of state-year spells	2,524.00	2,524.00	2,524.00
Number of founding events	1,711.00	1,711.00	1,711.00

^a Standard errors are in parentheses.

^b Thousands of constant 1987 dollars.

^c Gallons.

^d 1 = "yes," 0 = "no."

^e Millions of gallons.

^f Residual of regression of scale, brand proliferation, and advertising intensity variables on the four-firm ratio.

^g Average capacity in millions of gallons.

^h Average number of brands.

ⁱ Advertising costs per gallon in constant 1987 dollars/gallon sold.

^j Estimate of the variance of the gamma-distributed cluster-specific random effect in the negative multinomial model.

[†] $p < .10$

** $p < .01$

ing entries into the mass production segment and encouraging entries into peripheral segments of the industry. The impact of brand proliferation and advertising intensity on the farm winery founding rate is consistent with the predictions of Hypotheses 2a and 3a, respectively. Increasing brand proliferation and advertising intensity among mass production wineries has a negative effect on farm winery foundings. These results suggest that mass producers may be able to discourage the proliferation of farm wineries by introducing brands for niche markets and by creating an image of high quality for their own products through aggressive advertising and thus assuming a robust identity. Taken together, the models in Table 3 provide strong evidence in favor of both location and identity-based resource-partitioning processes in the wine industry.

Table 4 presents estimates from extended log-logistic models of farm winery mortality rates. Model 1 in Table 4 is a baseline model that takes into account differences in niche characteristics across states. Wineries located in states with greater per capita incomes experience lower mortality

rates. Note also that the estimate of β_0 is greater than 0, implying that farm wineries exhibit a strong "liability of adolescence" in their mortality rates. The estimate of β_0 in model 1 suggests that farm winery mortality first increases and then declines with age, with the maximum mortality rate reached at an age of ten years. Model 2 in Table 4 examines the effects of organizational characteristics on farm winery mortality rates. These characteristics include the size of each winery (measured as the natural logarithm of its capacity), the number of brands produced by each winery, and whether a winery produces one or more of several products. Two important identity characteristics of this specialist organizational form are size and acres of vineyard owned. Hypothesis 1a receives strong support. I found evidence of nonmonotonic size dependence in the farm winery mortality rate—midsized farm wineries experienced significantly lower mortality. The death rate of specialist organizations may decline with size until a particular point, after which it increases with size. This pattern of mortality is consistent with the possibility that at the boundary, the identity of the largest

TABLE 4
Log-Logistic Hazard Rate Models of Farm Winery Mortality^a

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
α_0	-2.1756** (.1622)	-2.1056** (.1411)	-2.1275** (.1446)	-2.2258** (.1568)	-2.2300** (.1714)
β_0	0.8644** (.0815)	0.9179** (.0783)	0.9100** (.0783)	0.8994** (.0766)	0.8940** (.0795)
γ_0	-1.9705** (.2590)	6.2375** (1.9827)	6.1182** (1.9898)	6.1670** (1.9854)	7.4951** (2.1608)
State per capita annual personal income ^b	-0.0786** (.0260)	-0.0445 (.0275)	-0.0407 (.0271)	-0.0712* (.0334)	-0.0440 (.0441)
State per capita annual wine consumption ^c	0.0053 (.0708)	0.0198 (.0742)	-0.0041 (.0718)	0.1328 (.1006)	0.2122* (.1069)
Percentage of state population in dry areas	0.0067 (.0065)	0.0104 (.0067)	0.0092 (.0066)	0.0130 ⁺ (.0068)	0.0158* (.0070)
State farm winery law ^d	0.2341 (.1504)	0.2863 ⁺ (.1558)	0.2597 ⁺ (.1533)	0.2179 (.1644)	0.3576* (.1767)
Organizational size ^e		-1.7426** (.4421)	-1.7403** (.4404)	-1.7884** (.4411)	-1.7204** (.4417)
Organizational size squared		0.0867** (.0240)	0.0867** (.0239)	0.0891** (.0239)	0.0858** (.0239)
Acres of vineyard ownership		-0.0042** (.0016)	-0.0043** (.0016)	-0.0043** (.0016)	-0.0045** (.0016)
Number of brands		0.0639 (.0449)			
Table wine producer ^d		-0.2364 (.2187)			
Dessert wine producer ^d		-0.0495 (.1472)			
Fruit wine producer ^d		0.0697 (.1377)			
Sparkling wine producer ^d		-0.4278* (.1763)	-0.4159* (.1770)	-0.4354* (.1758)	-0.4617** (.1768)
Vermouth producer ^d		0.6511* (.2995)	0.6408* (.2786)	0.6209* (.2764)	0.5228 ⁺ (.2830)
Brandy producer ^d		-0.4535 (.4906)			
Entry through acquisition ^a		0.6040** (.1584)	0.5690** (.1548)	0.5312** (.1614)	0.4958** (.1622)
Density of farm wineries in state				-0.0063* (.0030)	-0.0062* (.0031)
Density of farm wineries squared/ 1,000				0.0059 (.0050)	0.0064 (.0052)
Density of farm wineries in state at founding				0.0022* (.0009)	0.0019* (.0009)
Density of mass production wineries in state				0.0041 ⁺ (.0021)	0.0029 (.0022)
Total capacity of farm wineries ^f				0.0287** (.0099)	-0.0142 (.0171)
Volume of wine imports ^f					-0.0222** (.0043)
Industry concentration ^g					-0.0426* (.0193)
Scale of mass production wineries ^h					0.4227** (.1444)
Brand proliferation among mass production wineries ⁱ					-1.0303** (.3810)
Advertising intensity among mass production wineries ^j					1.5781 ⁺ (.8424)
-Log likelihood	1,710.79	1,681.38	1,683.81	1,673.71	1,657.35
Degrees of freedom	7	18	13	18	23
Number of firm-year spells	11,987	11,987	11,987	11,987	11,987
Number of mortality events	416	416	416	416	416

^a Standard errors are in parentheses. α_0 , β_0 , and γ_0 are parameter estimates for the constant terms in the *A*, *B*, and *C* covariate vectors of the extended log-logistic model, respectively.

^b Thousands of constant 1987 dollars.

^c Gallons.

^d 1 = "yes," 0 = "no."

^e Gallons of installed capacity; logarithm.

^f Millions of gallons.

^g Residual of regression of scale, brand proliferation, and advertising intensity variables on the four-firm ratio.

^h Average capacity in millions of gallons.

ⁱ Average number of brands.

^j Advertising costs per gallon in constant 1987 dollars/gallon sold.

⁺ $p < .10$

* $p < .05$

** $p < .01$

among the specialist organizations gets blurred and fades into that of the generalist mass producers.⁵ Consistent with Hypothesis 1b, the mortality rate is significantly lower for farm wineries that own greater vineyard acreage. Vineyard ownership allows farm wineries to exercise greater control over the quality of wine grapes and also to label their wines as estate-bottled and perhaps convey an image of higher product quality.

In addition, it appears that farm wineries producing sparkling wines have lower mortality rates and that those producing vermouth have higher mortality rates when compared to wineries that do not produce either of these products. Farm wineries that enter the wine industry through acquisition are more likely to fail than those that are founded as new organizations. This result is consistent with two explanations. First, organizations that are founded through acquisition are speculative and cannot survive in the long term. And second, such organizations are often headed by owners or managers who lack the industry experience that is crucial to the survival of specialist organizational forms such as farm wineries.

Model 3 in Table 4, the best-fitting model, includes the effects of key identity characteristics of the farm winery organizational form, such as size and ownership of vineyard land. In model 3 and the more complete model 5, the mortality rates seem to be influenced strongly by the level of institutional support for the organizational form. State laws designed to encourage farm wineries do increase foundings, but they also increase failures. These results suggest that incentives formulated to encourage the entry of specialist firms may lead to a level of entry that is higher than the carrying capacity of the niche, thus increasing the mortality rate among such entrants.

Model 4 in Table 4 examines density and mass dependence in farm winery mortality rates. State-level farm winery density had a nonmonotonic effect on the mortality rate, as implied by Hannan's (1986) model. However, the second-order effect was not significant, suggesting that legitimation dominates among farm wineries within each state. Carroll and Hannan's (1989) extension of the density model receives strong support—farm winery

density at founding has a significant, positive effect on the mortality rate. Farm wineries founded when the density within a state is high suffer higher mortality rates at all ages than those founded in low-density periods. State-level mass production winery density increased the farm winery mortality rate, though the effect was significant only at the .10 level. Models not reported here showed no impact of the density of farm wineries outside a state. These results suggest that both competition and legitimation occur primarily at the state level. Population mass, measured by the total capacity of farm wineries, has a positive effect on the mortality rate, suggesting that larger firms generate more competition (Barnett & Amburgey, 1990).

Model 5 in Table 4 presents the effects of niche formation, location-based resource partitioning, and generalist identity on the mortality rate of farm wineries. Delacroix and Solt's (1988) indicator of niche formation, the level of wine imports, has a negative effect. Consistent with previous findings, industry concentration, the measure of location-based resource partitioning, also has a negative effect on the mortality rate of farm wineries. Scale economies among mass production wineries increase the farm winery mortality rate. It is possible that this variable represents two underlying effects. The greater size of mass production wineries encourages new entrants to choose the farm winery segment. But the larger mass producers can also diminish the survival chances of farm wineries through the control of key complementary assets such as distribution channels. Greater brand proliferation among mass producers reduces the farm winery mortality rate, contrary to the prediction of Hypothesis 2b. Higher advertising intensity among mass production wineries increases farm winery mortality, supporting Hypothesis 3b. Combined with the earlier finding that greater advertising intensity suppressed farm winery foundings, this result strongly supports the argument that mass producers can have a competitive impact on the farm winery subpopulation through mass advertising. In other words, mass production wineries use higher advertising outlays to create robust identities that allow them to compete effectively in both the generalist and specialist segments of the U.S. wine industry.

DISCUSSION

Farm wineries are instances of organizations with a specialist form operating in a mature industry. The resource-partitioning model suggests that the high concentration that is often a feature of industry maturity has different implications for the

⁵ This result is consistent with size-localized models of competition. Since the smallest mass producers and the largest of the specialist organizations would fall in the middle of the size distribution for the entire population, they are likely to have higher death rates (Baum & Mezias, 1992; Hannan, Ranger-Moore, & Banaszak-Holl, 1990; Wholey, Christianson, & Sanchez, 1992).

performance of specialist and generalist organizations. The results obtained in this study suggest that useful insights into industry evolution can be obtained by dividing mature industries (or organizational populations) into two strategic groups (or organizational subpopulations): generalists and specialists. In an attempt to redefine empirical research on strategic groups, Carroll and Swaminathan (1992) suggested two promising directions for future investigation. First, they advocated the use of the concept of organizational form to define strategic groups within an industry (see Barnett, 1993). Second, they proposed using nonaccounting measures, such as organizational founding and mortality rates, outcomes that are determined by membership in and interdependence between strategic groups in an industry. This study extended the findings of Carroll and Swaminathan to the study of organizational change in a mature industry. Its results confirm a strong effect of location-based resource partitioning on increasing the founding rate and decreasing the mortality rate of specialist organizations—farm wineries—in the American wine industry.

In addition, this study shows that identity characteristics of specialist and generalist organizational forms play an important role in the evolution of specialist organizational forms (see also Carroll and Swaminathan [2000] on specialist organizations in the brewing industry). Two important identity characteristics of farm wineries are their smallness and their reputation for high quality tied to vineyard ownership. Farm wineries that deviated from the identity characteristics of their organizational form suffered poor performance. Large farm wineries experienced much higher mortality rates than midsized ones. Farm wineries often launch ambitious growth programs funded by bank debt. Prominent failures, such as that of the wine management group Vintech of Santa Rosa, California, have drawn attention to the sensitivity of an aggressive growth strategy to industry downturns (Berger, 1991; Prial, 1991). Farm wineries that own larger vineyards suffer less mortality, possibly reflecting their greater control over the quality of raw materials. Vineyard ownership also ties up the best-quality grapes and thus disadvantages other farm wineries that do not own vineyards and depend upon such supplies.

Perhaps the most interesting set of results involves generalist responses to the growth of the specialist segment. The results suggest that mass producers that adopt a robust identity through brand proliferation coupled with higher advertising expenditures succeed in breaching the boundaries between the generalist and specialist sub-

populations. Greater advertising intensity among mass producers is found in conjunction with a lower founding rate and a higher mortality rate among farm wineries. These results suggest the possibility that mass producers may adversely affect the fortunes of the farm winery subpopulation by creating a superior image for their own products through heavy advertising, an image that may offset the quality image cultivated by farm wineries. This trend can be witnessed in the growth of mass producers who produce "value" wines. Kendall-Jackson Vineyards of Santa Rosa, California, is a good example of a value vintner; by offering products such as a sweet Chardonnay for \$9 a bottle, it has become the fastest-growing mass producer over the last decade (Fisher, 1992). Other "value" mass producers include firms such as Clos du Bois, Fetzer, Beringer, and Stimson Lane Wine and Spirits, with its Columbia Crest label. Most of these firms sell wine at \$7 to \$10 a bottle of a quality that might otherwise cost the consumer \$12 to \$16 a bottle.

Though the research described above adds to understanding of the evolution of strategic groups or subpopulations composed of specialist organizations, much work remains to be done. Two separate lines of inquiry appear to be promising for extending this research. The pattern of results for the impact of identity characteristics of the generalist organizational form on the founding and mortality rate of specialists suggests that researchers need to pay more attention to the forces that cause more or less overlap between these two segments of an industry. In models of niche overlap in ecological research, niches or resource spaces are typically treated as n -dimensional rectangles in multidimensional space (e.g., Baum & Singh, 1994a, 1994b; McPherson, 1983). Péli and Nooteboom (1999) reconceptualized niches as n -dimensional spheres, derived the basic predictions of the resource-partitioning model, and further explained why generalists do not expand to occupy the entire resource space available to a population. Empirically, rather than resort to using measures of generalist segment structure to infer generalist firm behavior, it would be more useful to model the impact of generalist firm actions that may lead to different degrees of overlap along multiple dimensions with firms in the specialist segment. One could then distinguish between the impact of scale economies that might be exogenously determined by technological change and the impact of generalist firm strategies, such as brand proliferation and intensive advertising, that are endogenous to an industry (Boone & Witteloostuijn, 1995). In other words, researchers need to develop an understanding of the resource-partitioning process by examining the actual be-

havior of generalist and specialist firms (see, for example, Seidel's [1997] analysis of the U.S. airline industry). For instance, farm wineries have responded in different ways to competition from mass producers of "value" wines. Some farm wineries have adopted identity characteristics that are more typical of the mass producers by emphasizing distribution and advertising (Akst, 1991; Anderson, 1990). An example of such change was Winterbrook Vineyard's decision to spend \$500,000, or as much as 11 percent of its projected 1991 sales revenues, on advertising and promotion, making it one of the largest advertisers among California farm wineries (Graebner, 1991). Other farm wineries have moved in the opposite direction and tried to redefine the identity of the farm winery organizational form more narrowly by focusing on wine from a single grape variety rather than two or three. For instance, both the B.R. Cohn Winery in Glen Ellen, California, and the Chimney Rock Winery in Napa, California, decided to specialize in cabernet sauvignon and reduced their output of chardonnay to minimal levels (Berger, 1992). The success of these alternative approaches to competing in the wine industry depends on whether wineries can maintain robust identities that allow them to compete in both the generalist and specialist segments.

Second, future research could also examine the role of communal support structures in the evolution of specialist organizations. Piore and Sabel (1984: 265-266) argued that various forms of institutional cooperation helped in the growth of specialized industrial districts such as those in the textile and clothing industry in Italy and the United States (Lazerson, 1988; Uzzi, 1996). Some institutions, such as trade associations, guilds, and unions, serve a sociopolitical purpose, providing a collective voice for specialist firms within an industry. Others, such as purchasing and marketing cooperatives, fulfill an economic rationale. By using other specialist firms that offer ways to share equipment, office space, financing, purchasing, marketing, distribution, and so on, small firms can obtain economies of scale similar to those of large enterprises. In other words, specialist organizations in mature industries are likely to coevolve with other forms of specialist organizations. For instance, the wine industry in the immediate post-Prohibition period consisted of a large number of warehouses. Warehouses in the post-Prohibition period provided much-needed storage capacity, especially for the smaller farm wineries. As the early farm wineries dwindled in numbers, so did the warehouses that served their needs. Interestingly, casual observation indicates that the rejuvenation of the farm winery segment that began in the late

sixties was accompanied by a growth in the number of warehouses that performed several service functions for the farm wineries, such as storage, shipping and handling, and accounting. Another trend that has obvious implications for farm wineries is the consolidation among wholesalers and retailers in recent years. Farm wineries are likely to be adversely affected by a reduction in the number of independent distributors. An examination of such complex interdependencies between organizational forms will provide a more complete understanding of the evolution of specialist organizations in mature industries.

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